EQUIPMENT USED IN WELLS

"We know the value of water when the well runs dry (or, when the pump doesn't work!)"

Every day, millions of water pumps deliver water from wells to homes, farms and businesses. Very few well owners give much thought to pump equipment that typically provides 15+ years of trouble free service, in fact, many of the general public would not even recognize a well pump if they saw one. Without pumps, we could not access ground water. Just as a pump is the link to the resource, so too can public awareness about the importance of pumping equipment lead to greater understanding of the value of ground water. The information below is a simple description of the two main types of well pump used for home water supply. Homeowners can benefit from understanding what sort of pump they have and how it works.

Submersible Pumps

About 60% of home wells in the U.S. use electric submersible pumps. Submersible pumps are long cylinders usually 3 to 5 inches in diameter and 2 to 4 feet long. An electric cable is attached to the motor and connects to a control panel, often in the home's basement. A water delivery pipe comes up the well from the pump into the home. The pipe is usually plastic, but steel pipe may also be used. The electric motor and the pump are installed as one unit in the well. To ensure that water supply is reliable, even in droughts, submersible pumps may be set hundreds of feet beneath the water in a well. When the pump switches on, the motor runs (usually at 3,500 revolutions per minute) and turns a series of impellers that push water up out of the well. Some well pumps are designed to work at variable speeds, in order to maintain constant pressure. Variable speed motors can run up to 8,000 rpm. The speed of the motor is regulated by the home's use of water and an electrical/mechanical device measures the demand for pressure and adjusts the pump flow rate to match.

Jet Pumps

Approximately 32% of U.S. homes have shallow well jet pumps. In these pumps, the motor and pump are not in the well but are usually close to the well in a basement or utility room. Jet pumps work by pumping water under pressure through an ejector into a discharge pipe coming up from the well. As the jet of high-pressure water is forced into the discharge pipe, it creates a vacuum and causes water to be drawn from the well. Back at the surface, some of the water is piped to a home's plumbing and some is routed back to the ejector to raise more water from the well. Shallow well jet pumps are not effective at depths below 25 feet but have the advantage of having no working parts down the well and so can be used in narrow diameter wells. Jet pumps use more electricity than submersible pumps.

Deep well jet pumps are used in 8% of U.S. homes. These pumps are similar to shallow well jet pumps but the ejector is installed down the well instead of being attached to the pump. Deep well jet pumps can pull up water from depths of 75 feet. Sometimes you'll hear the name "convertible pump." This simply means that the pump can be used for either shallow or deep well applications, depending on how the pump contractor installs the ejector.

There are many different well pumps available. To decide on the appropriate pump size for gallons per-minute yield and to select the horsepower of motor needed to deliver it, you need to know the following:

- How much water will be needed at peak demand
- The well's yield potential (gallons per minute)
- Diameter of well at pumping level (the well diameter at this depth may be smaller than at ground level)
- Water level drawdown at given pumping rates
- Depth of ground water below the surface (in some geologic conditions water levels will drop in drought conditions and the pump will therefore need to be placed deep in the well)
- Distance and elevation of the home above the well

Most home well pumps, unless used to irrigate gardens or paddocks, will only be used for a few minutes at a time or perhaps an hour or two each day. It is recommended that pump selection, and installation

work, including wiring and plumbing be performed by licensed contractors. No matter how cheaply they were able to buy a pump, if a homeowner uses an oversized or undersized pump, it will not be as efficient in water production, energy cost or reliability, than installing the correct pump, wiring and pressure tank for the job.

High capacity wells that supply water utilities and irrigators will use either large electrical submersible pumps or turbine pumps. Turbine pumps have the driving motor (may be electrical, gasoline or diesel) at the top of the well. All pumps, of any size, are mechanical devices, and from time to time may need servicing or replacement. Fortunately for virtually all of America's 15 million homes with their own well, their water pumps work reliably day after day, year after year. The very efficiency and longevity of pumps is one of the reasons that for many people, safe dependable water supply from ground water sources is taken for granted.